FOR #1 AIRPLANE
ON DELIVERY

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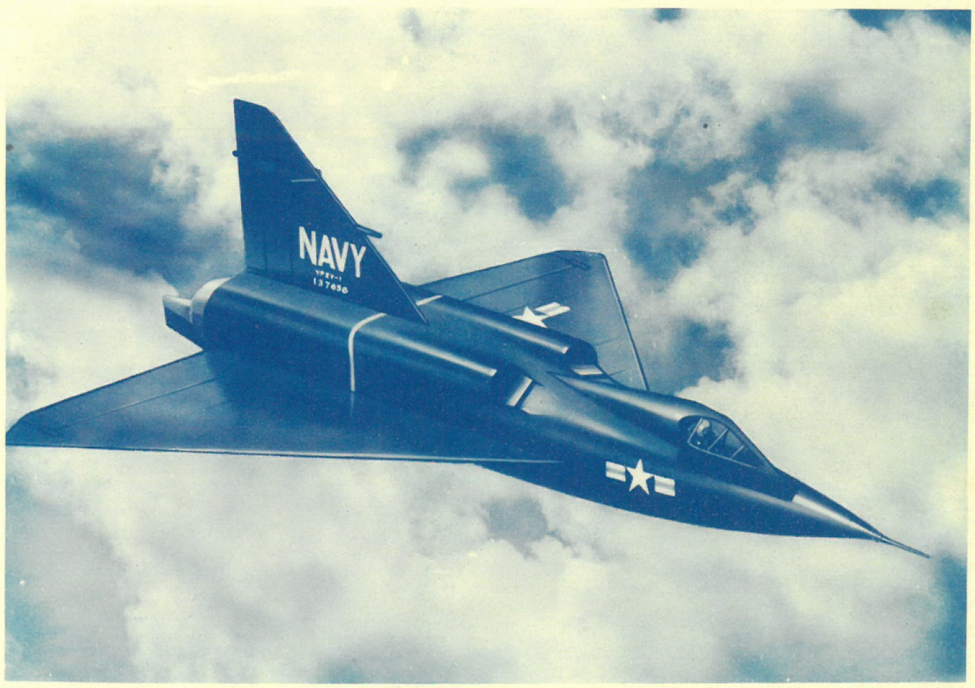
ZM-2-035
15 March 1955

UTILITY
FLIGHT HANDBOOK
NAVY MODEL YF2Y-1 AIRPLANE
SEA DART



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B104 F28 YF2Y-1 UTILITY FLIGHT HANDBOOK ZM-2-035 15 MAR 1955

SECTION 1

DESCRIPTION

THE AIRPLANE.

The Navy designated Model YF2Y-1 airplane (Class VF Seaplane), manufactured by Convair, is a single-place, tactical type, ski-equipped, twin-engined, tailless seaplane with a thin, 60-degree, delta planform wing and a half-delta vertical fin (figure 1-1). The airplane operates with two Westinghouse J46-WE-12B turbojet engines equipped with Westinghouse afterburners. Each engine is rated at 5725 pounds static thrust at maximum power (with afterburning). Take-off gross weight with full fuel (no ballast) is approximately 21,000 pounds. Its primary mission is the investigation of parameters affecting the hydrodynamic and aerodynamic design characteristics of high speed (supersonic), water-based airplanes. It is capable of moving on the shore, down a 1:10 sloped ramp into the water, taking off from and alighting upon the water, and returning up the ramp under its own power without the aid of restraining or towing gear.

The hull is compartmented to provide water-tight integrity and static floatation. The entire hull, the skis, the nacelle section in these areas through which water could enter structural cavities, the vertical fin, rudder, and the entire wing including the elevons are watertight. Hydrodynamic suspension at higher speeds is obtained by the twin hydroskis. In flight, the skis are retracted into the hull ski wells and held faired with the hull to minimize drag. A fixed ventral fin is provided along the hull center line to aid directional stability on the water. A tail beaching wheel in the aft end of the ventral fin together with a retractable taxi wheel in the aft end of each ski provide a three-point beaching and ground taxi gear which enables the pilot to launch and beach the airplane under its own power. A combined dive brake, water brake, water rudder in the stern provides aerodynamic and water braking and maneuverability during water taxi operations. The cockpit is pressurized and air conditioned. An ejectable canopy and ejection seat are provided.

Engines are mounted side by side, above the wing, in left and right nacelles which are separated by the hull upper vertical beam. Ram air for engine operation and engine and nacelle cooling is controlled by engine duct doors installed in the forward section of each engine air inlet duct. Fuel is carried in five, interconnected, bladder type fuel cells which provide a net fuel capacity of approximately 630 gallons. All fuel cells are installed in the hull below the wing.

A dual, full hydraulic, irreversible, power control system is provided for operating the primary flight control surfaces (LH and RH elevon and rudder), dive brakes-water rudder, ski mechanism, engine duct doors, and beaching wheel brakes. Refer to Hydraulic Power Supply, this section following. Artifical feel mechanisms are incorporated in the flight control mechanical systems to simulate the feel of air loads on the elevons and rudder.

A low pressure pneumatic system, which receives its air supply from the compressor section of each engine, supplies the air for cockpit air conditioning and pressurization, windshield defogging, canopy seal pressurization, hydraulic reservoir pressurization, and operation of the "Q"-spring loader unit in the elevator feel system.

The electrical system consists of a d-c system which is powered by a storage battery and two engine-driven generators and an a-c system, powered by two direct current-driven inverters.

The airplane general arrangement is shown in figure 1-2. The general arrangement of the cockpit is shown in figure 1-3.

DIMENSIONS.

Wing span	33.67 feet
Length	52.58 feet
Height (Skis up)	16 feet, 2 inches
Height (Skis down)	20 feet, 9 inches
Wing area	563 square feet

ENGINES.

Each engine is a Model J46-WE-12B turbojet with afterburner delivering a rated, sea-level, maximum static thrust of approximately 5725 pounds (afterburning). The engine consists of an axial-flow, 12-stage compressor, a double fuel manifold with 36 fuel vaporizing tubes, a single annular combustion chamber, a two-stage gas turbine, an afterburner for thrust augmentation, a variable area exhaust nozzle, and associated accessories mounted on the bottom of the engine forward of the combustion chamber. Each engine is equipped with an air turbine motor type starter.

Electrical power for the engine control circuits is taken off the 28-volt, essential d-c bus via circuit breakers on the pilot's circuit breaker panel and labeled EXH NOZ OVERRIDE, L. H. ENG CONTROL, R. H. ENG CONTROL. Electrical power for the afterburner control circuits is supplied by the 115-volt, non-essential a-c bus via fuses located in the a-c power distribution panel.

ENGINE FUEL SYSTEM.

The basic engine fuel system (figure 1-8) consists of an engine-driven booster pump, engine-driven dual fuel pump, overspeed relay, fuel regulator, fuel distributor and dump valve.

Note

> The afterburner fuel system, which consists primarily of an afterburner fuel pump, regulator, and distributor, is discussed in AFTERBURNER FUEL SYSTEM, this section, following.

The centrifugal type engine-driven booster pump receives fuel from the airplane tank booster pumps and, by means of an integral pressure regulating valve, delivers fuel at constant pressure to the engine dual fuel pump. Normally, the engine-driven booster pump also supplies fuel to the afterburner fuel pump. During high speed, low level flight, however, the afterburner fuel pump will also receive fuel directly from the airplane booster pumps.

The engine dual fuel pump contains two identical gear pumps in a common housing, having co-axial shafts with separate shear sections. The two individual pumping elements constitute the primary and emergency fuel pumps, each with a rated capacity of 10,000 pounds per hour at 550 psig output pressure. Normally, the output of the emergency pump element is bypassed internally, and the primary pump element supplies the entire engine fuel flow. The emergency pump automatically supplies fuel if the primary pump becomes inoperative. The emergency pump element may be manually selected by the pilot by means of the engine fuel pump switches, located on the left console.

Note

> At low rpm and low fuel flow both pump elements supply fuel and the emergency fuel pump light will be illuminated.

From the dual fuel pump, fuel passes through a micronic type filter to the basic engine fuel regulator which serves to meter the correct amount of fuel to the engine under all operating conditions. The regulator contains the basic engine fuel metering elements which consist of a throttling valve, acceleration valve, overspeed valve, combination check and shut-off valve, and safety relief valve. The throttle valve is linked directly to the pilot's power lever and meters fuel for steady state engine operation in direct response to power lever movement. Fuel for acceleration is limited by a compressor pressure rise signal received at the acceleration valve. Military rpm stabilization is provided by the governing action of the overspeed relay in conjunction with the overspeed fuel valve.

Metered fuel then flows to the distributor which contains a check valve and a dump valve. The check valve provides fuel pressure for the two engine igniter nozzles and pressure to close the dump valve. Fuel is directed to the igniter nozzles via a solenoid valve which is normally closed. During the engine starting cycle, this solenoid is energized in conjunction with the ignition circuit and allows fuel flow to the igniter nozzles. After the starting cycle is completed, the solenoid is de-energized. From the check valve, fuel flows to the dump valve which remains closed until engine shutdown at which time it opens to drain fuel from the distribution system to prevent residual fuel fire in the engine combustion section. The distributor valve divides the metered fuel for 36 vaporizing nozzles which inject the fuel as vapor into the combustion chamber.

For information on the afterburner fuel system, refer to AFTERBURNER, following.

Engine Fuel Pump Switches and Indicator Lights.

Two on-off type toggle switches, mounted on the LH console (10, 40, figure 1-4), are provided for pilot selection of the emergency pump element in the engine-driven dual fuel pump. These switches, one for each engine, are placarded LH ENG, PRIMARY, EMER and RH ENG, PRIMARY, EMER.

During engine operation, a drop in fuel pressure through the primary pump element of the dual fuel pump automatically causes the emergency pump bypass valve to close, which causes the emergency pump to supply high pressure fuel flow to the fuel regulator. During emergency pump operation, an emergency pump flow switch actuates to close an electrical warning circuit which turns on the red warning light located directly above each selector switch. If, during normal engine operation, the selector switch is operated to the emergency position, a simulated primary pump failure will be affected, and the light will be energized, The selector switch, therefore, serves as a test switch for checking out the operation of the emergency pump prior to take-off. Power is supplied from the 28-volt, essential d-c bus via circuit breakers on the pilot's circuit breaker panel and labeled L. H. ENG CONTROL, R. H. ENG CONTROL.

OIL RESERVOIR.

The oil reservoir is integral with the engine and located in the rear of the accessory gear box portion of the inlet housing assembly. The capacity of the oil reservoir is 3.25 gallons. The usable quantity is 1.25 gallons. Refer to figure 1-21.

A swivel inlet is incorporated in the oil reservoir to maintain a continuous oil supply for 30 second periods during flight maneuvers resulting in negative G conditions. Scavenge ports are so located to insure satisfactory scavenging under these engine operating conditions.

OIL PUMPS.

The main oil pump, a combination feed and scavenge unit is mounted on the rear face of the accessory gear box. Eight pump elements, containing two feed and six scavenge elements, comprise the main oil pump. Each element is a positive displacement rotary type pump. The feed unit consists of two rotary pumps, the primary pump supplying oil at 5.5 gallons per minute at military power and the auxiliary pump supplying 6.0 gallons per minute at afterburner power. Each pump is mounted on a separate shaft and receives oil through an individual oil inlet from the oil reservoir.

The scavenge unit, built into the oil pump assembly, consists of six separate rotary pumps. Four scavenge pumps, mounted on the shaft of the auxiliary oil pump, scavenge the No. 3 bearing, the No. 1 bearing, nose compartment, and rear of the gear box. Two scavenge pumps for the No. 2 bearing and the front gear box, are mounted on the shaft of the primary oil pump.

The variable displacement or variable delivery pump is the controlling element for the exhaust nozzle actuator. This pump, which is mounted on the rear of the main oil pump housing, is driven through a spline coupling on the end of the primary engine oil pump drive shaft.

EXHAUST NOZZLE ACTUATOR.

The exhaust nozzle actuator, which is a rapid-acting, high-force, oil-operated hydraulic cylinder, is supplied oil by the engine lubrication system. The actuator is capable of exerting forces of approximately 5100 pounds on its linkage during nozzle closing, and approximately 3500 pounds during nozzle opening. High pressure oil from the variable delivery oil pump is pumped into the exhaust nozzle actuator to a maximum pressure of approximately 1850 psi. Normal operating pressure within the exhaust nozzle actuator is approximately 1000 psi.

Fuel pressure for the engine-mounted, engine-driven booster pumps is supplied by three submerged, electrically operated, centrifugal pumps located in the bottom of the LH forward, and LH and RH aft cells. The pump in the forward cell acts in the capacity of both a transfer pump and booster pump. At low fuel rates (0 to 46 gpm), this pump transfers its entire output into the compartment aft of the baffle in the LH aft cell via the back pressure valve (figure 1-11). At intermediate flow rates (46 to 82 gpm), this pump delivers part of its flow into the main supply line to the engines and part through the back pressure valve. At high flow rates (82 to 96 gpm), the pressure in the supply line drops sufficiently to cause the back pressure valve to close completely thus causing the transfer pump to deliver its entire output into the supply line. If any one pump fails, the two remaining pumps are sufficient to supply the engine booster pump with fuel at 10 psig.

A transfer pump, installed in the auxiliary or aft cell, pumps auxiliary cell fuel into the LH aft cell via a remotely controlled shut-off valve. A float-operated level control valve, located in the LH forward cell, controls the opening and closing of this shut-off valve. When the fuel level in the forward cell drops sufficiently to cause the float valve to operate, the shut-off valve is opened and, providing the auxiliary tank pump switch (AUX TANK) is ON, permits auxiliary tank fuel to flow into the LH aft cell. A pressure switch in the auxiliary cell, set to operate on descending pressure at 5 psi, turns on an indicator light (AUX TANK EMPTY) in the cockpit to warn the pilot when the auxiliary fuel supply has been transferred. The AUX TANK switch must be ON for the AUX TANK EMPTY light to illuminate.

The entire fuel system is filled at a single filler adapter (figure 1-21). Interconnectors are provided between left and right cells and forward and aft cells. An interconnecting, electrically operated gate type filler valve is installed between the RH aft cell and the auxiliary cell to provide for refueling the latter. During the refueling operation, this valve is opened by a toggle switch (AUX TANK FILLER VALVE) which is located on the fuel tank drain valve switch panel (figure 1-21). A red warning light (LIGHT ON, VALVE OPEN), also located on this panel, is illuminated as long as the gate valve is open. This valve must be closed at the conclusion of the fueling operation. The light will then go out.

The fuel quantity measuring system is a capacitator type characterized to provide linear relationship between the electrical capacitance and the volume of fuel sensed. Components of the system include five tank-mounted probes (connected in series), connectors, a compensator unit, and a power unit. The circuit is powered from the 115-volt, essential, a-c bus. Two probes are installed in the left forward cell, two in the left aft cell (one of which is aft of the tank baffle), and one in the auxiliary cell.

FUEL SELECTOR SWITCHES.

Two on-off toggle switches, each labeled FUEL VALVE, are mounted in the aft corners of the left console (6, 45, figure 1-4). These switches control the motor-driven shut-off valves,

HYDRAULIC POWER SUPPLY.

Hydraulic pressure is supplied by two independent, closed center type systems (figure 1-15) each of which is equipped with a piston type, variable volume pump mounted on and driven by the engine accessory gear drive. The systems are of the demand type, with a pressure controlling device incorporated as an integral part of the pumps. With no demand on the system, i.e., no hydraulically powered equipment being operated, the system pressure is 3000 psi and the fluid flow zero. With a drop in pressure demand to 2000 psi, the pump flow increases to 20 gpm. From 2000 psi to zero, the flow increases from 20 gpm to 21 gpm. Hydraulic fluid is MIL-O-5606.

The left engine hydraulic system supplies power for operation of the right engine air inlet duct door, ski wheel brakes, surface controls (rudder and elevon servo systems), dive brake-water rudder, ski wheel rotation (extension and retraction), and ski extension and retraction. The right engine hydraulic system operates the left engine duct door and the surface controls (rudder and elevon servo systems). Normally, during two engine operation, the two independent hydraulic systems operate together and simultaneously; each supplies half the total pressure requirements for the primary flight control systems for maximum speed and altitude. Either system alone, however, is capable of supplying the flight control systems with pressure sufficient for normal operation within the allowable acceleration limits.

Each pump is supplied fluid by a pressurized hydraulic reservoir. The other major components included in each supply system are: pump purge valve, pressure-actuated switch, high pressure line filter, accumulator, pressure transmitter, and main relief valve. All system components except the pumps are mounted on the airframe. The ski air storage bottles and hydraulic reservoirs are accessible through the instrumentation hatch located aft of the canopy in the top of the hull.

Each reservoir contains a replaceable, micronic oil filter and two relief valves which by-pass return fluid around the filter to pump supply if the filter becomes clogged sufficiently to produce a 12 psi differential pressure. A fitting for bleeding air pressure from the reservoirs is provided in the air charging line between each reservoir and its respective air pressure regulator (4, figure 1-21). The reservoirs are precharged to a pressure of 12 psi via the ground charging connection (11, figure 1-21). With engines operating, reservoir pressurization is maintained by the low pressure (compressor bleed) pneumatic system (figure 1-19).

The hydraulic system accumulators are precharged and the ski air storage cylinders filled with compressed dry nitrogen to the following pressures:

Left and right system accumulators	1000 psi
Ski system air storage cylinders (with skis full down and airplane supported by jacks)	275 ± 20 psi
Emergency ski lowering air storage cylinders	3000 psi

Refer to figure 1-21 for locations of filler points for preflight servicing.

The purge valves, connected between the pump pressure-out lines and pump return lines, are spring-loaded units which permit bypassing pump output back to the reservoir up to 500 psi, or 4 gpm, thus relieving the pump of load during starting. After 500 psi, or 4 gpm is reached, the purge valves close and pump output is taken by the high pressure line. The purge valves remain closed until system pressure is removed by engine shut-down.

The main pressure relief valves are set to relieve system pressure back to the reservoir at 3300 +50, -0 psi. The relief valves reseat when decreasing pressure reaches 3100 psi.

HYDRAULIC PRESSURE INDICATORS.

A pressure gage for each hydraulic system is located on the pilot's instrument panel (27, 28, figure 1-6). The hydraulic pressure transmitter for each instrument is located downstream from its respective system accumulator. The circuit is powered by the 26-volt a-c instrument transformer.

HYDRAULIC PRESSURE LOW WARNING LIGHT.

A red warning light placarded HYD PRESS LOW is located on the pilot's instrument panel (7, figure 1-6). Either the LH or the RH pressure-actuated switch will energize the light when hydraulic pressure in either system falls below 1600 ±50 psi. On increasing pressure, the light will go out when both systems are charged to 1800 ±100 psi. The circuit is powered by the 28-volt, essential, d-c bus via the warning light dimmer control and the WARN LIGHTS circuit breaker on the pilot's circuit breaker panel.

TAXI WHEELS AND SKI POSITION INDICATORS.

Refer to ALIGHTING AND BEACHING GEAR SYSTEM, following.

for right nacelles. Pushing the button on the left side of the panel energizes its engine and afterburner thermal switch circuits and turns on both lights; pushing the button on the right side of the panel energizes the warning lights for the circuits in the right nacelle. Power for the circuit is taken from the 28-volt, primary d-c bus.

FIRE EXTINGUISHING SYSTEM.

A single shot, single bottle, engine fire extinguisher system can supply methyl bromide to either nacelle. The agent is discharged through two spray rings, one located at the front of the engine compressor compartment, the other aft of the fire wall and along the nacelle vertical center beam structure. The bottle is mounted in the hull compartment just aft of the auxiliary fuel tank. The combination charging and pressure relief head on the bottle is connected to a flush-mounted, red celluloid indicator cap located in the side of the left nacelle above the wing. If the temperature inside the bottle expands the gas to 600 psi, a safety disc in the line to the cap will rupture and the released gas will blow out the indicator cap and discharge overboard.

Fire Extinguisher System Selector Switches.

A momentary contact type toggle switch with guard labeled FIRE is provided for each nacelle (11, 15, figure 1-[illegible]). The switch on the left side of the instrument panel discharges all the agent into the left nacelle; the switch on the right side discharges the entire contents of the same bottle into the right nacelle. Thus, the system can be operated only once - for either nacelle.

WARNING

> Before discharging the fire extinguisher system, place the cabin air supply control handle in the RAM AIR position. During ground or water operation and low speed flight, the engine compressor may be totally or partially supplied with air from within the nacelle and discharged methyl bromide may enter the cockpit through the pressurization system.

CANOPY AND EJECTION SYSTEM.

The canopy and sloping "V" windshield are incorporated in one unit, hinged at the aft end, and secured in the closed position by four shear pin type latches on each longeron. The canopy can be latched or unlatched from either inside or outside the cockpit (figure 1-20).

When the latches are released, the canopy swings up into a 'floating' position, open at the forward edge approximately 12 inches. An adjustable, spring-loaded, counter-balance mechanism, located within the canopy fairing, controls the force required to raise and lower the canopy. When the canopy is pushed to its maximum open position (approximately 62 inches at the forward edge), a latch automatically engages and locks the canopy up. A red uplatch release lever (figure 1-20), located just aft of the right shoulder pad on the side of the canopy, releases the up latch and the canopy is then free to swing down into the 'floating' position. This lever is placarded CANOPY RELEASE. A pressurized canopy seal, located around the canopy-cockpit parting line, is automatically pressurized by the bleed air system via a canopy seal pressurization valve when the canopy is in the closed and lock position. Refer to CANOPY SEAL PRESSURIZATION, Section IV.

The canopy can be unlatched and jettisoned by means of an air-operated canopy unlatch and ballistics remover system in two ways. The primary method of ejection is by means of the face curtain handgrip which is operated either as the second step in the normal seat ejection procedure or separately without ejecting the seat. In either case, pulling the face curtain down operates the canopy unlatch system and fires the canopy removers.

The sequence of operation of the unlatch system is as follows: compressed air, stored in two reservoirs at 2000 psi, is released into a 3-way valve that releases canopy seal pressure and directs the air charge to the forward and side unlatch air cylinders. The forward cylinder operates a linkage which pulls the safety pin in both canopy removers and operates in conjunction with the left and right unlatch cylinders to unlock the canopy latches. Pulling the canopy remover safety pins fires the canopy up and aft. As it breaks away at the hinge support, a trailing wire attached between the seat ejection catapult and the canopy fires the seat catapult if the leg braces have been previously pulled up for seat ejection.

Note

> The seat firing trailing wire is not connected between the canopy and the seat catapult until the seat leg braces are pulled up into the locked position for seat ejection. Refer to Seat and Ejection System, this Section, following.

CANOPY CONTROLS.

The canopy latching mechanism is operated from outside the canopy by a flush type handle (figure 1-20), located on the left side of the hull in line with the forward edge of the canopy. The handle is operated according to the placarded instruction: CANOPY RELEASE, PULL HANDLE OUT, THEN TURN. (Turn clockwise.)

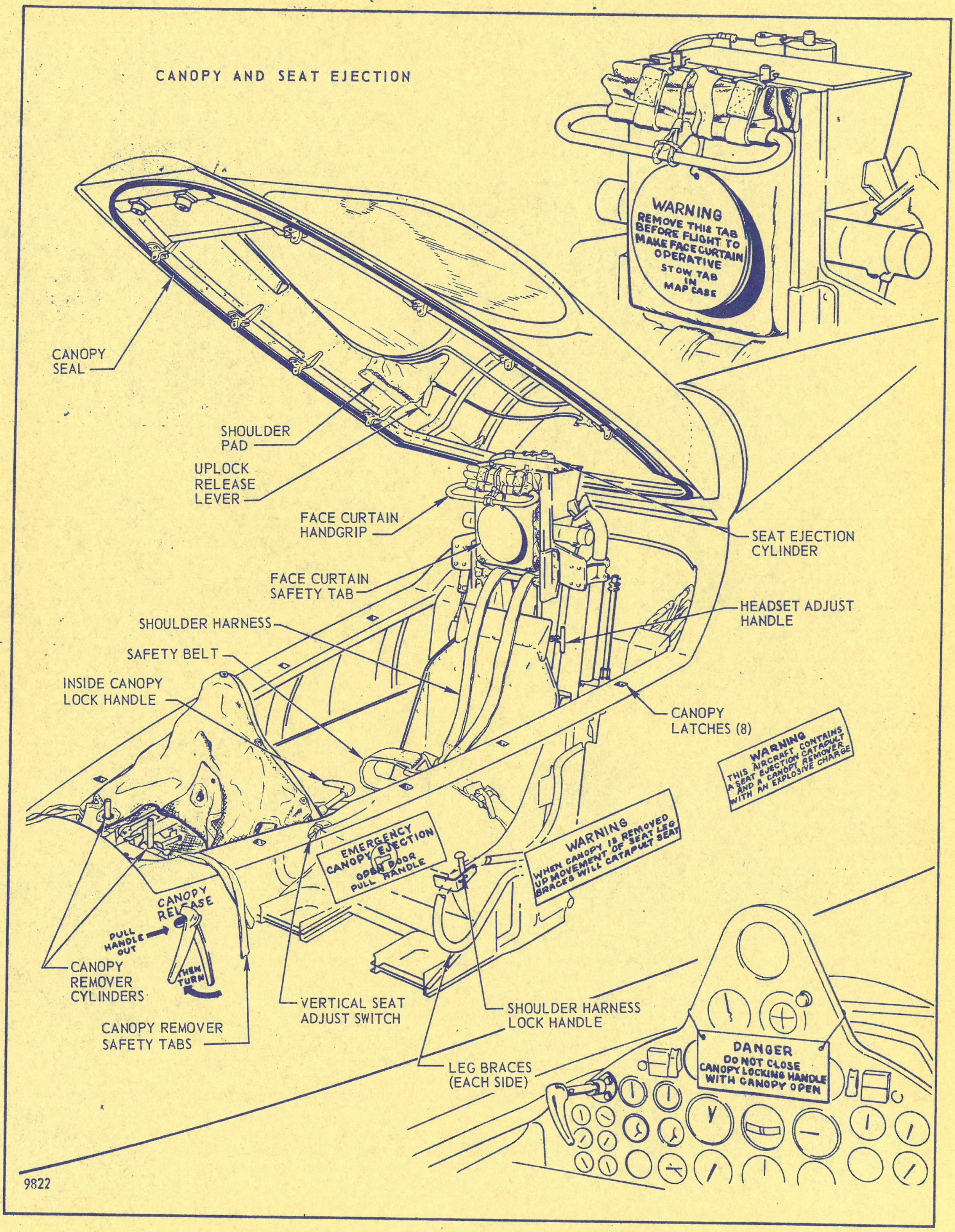


Figure 1-20. Canopy and Seat Ejection

Inside the cockpit, the canopy latching mechanism is operated by an "L"-shaped handle (19, figure 1-6), located on the left side of the instrument panel. To open the canopy, the handle is rotated clockwise and pulled out approximately three inches. To latch the canopy the handle is pushed in and turned counterclockwise. The inside and outside handles are interlocked through the latch mechanism; operating one handle causes the other handle to operate. During canopy unlatching, turning the interior handle clockwise causes the exterior handle to move outboard from the faired position; then pulling the interior handle aft causes the exterior handle to turn clockwise. During canopy latching, pushing interior handle in causes exterior handle to turn counterclockwise; then rotating interior handle counterclockwise pulls exterior handle into the faired position.

SEAT AND EJECTION SYSTEM.

An ejection seat with safety belt and shoulder harness (figure 1-20) is provided to enable the pilot to abandon the airplane at high speeds, regardless of flight attitude. Refer to Section III, figure 3-1 for safe seat ejection airspeeds. A ballistics type, tubular catapult, mounted aft of the seat houses the seat catapult cartridge which supplies the propelling force to eject the seat and pilot clear of the vertical fin. The seat is ejected when the seat face curtain is pulled down to its limit of travel after the leg braces are first pulled up into the locked position. Operating the leg braces locks the shoulder harness, pulls the catapult safety pin, connects the seat firing wire between the catapult and canopy, and releases cockpit pressure via the cockpit dump valve. Pulling the face curtain out and full down releases canopy seal pressure, canopy latches, canopy remover safety pins, and fires the canopy removers. The canopy trailing wire fires the seat ejector.

If the canopy has been ejected without locking the leg braces into the up position, the seat catapult firing wire is then connected to the leg braces, and the seat can then be ejected by pulling the leg braces into the locked up position. This also locks the inertia reel prior to pulling the catapult safety pin.

A ground safety pin, which prevents operating the seat face curtain, prevents accidental firing of the canopy removers and seat catapult while the airplane is on the ground. The ground safety pin must be removed and stowed before flight and replaced immediately upon landing.

The G-suit, oxygen hose, and microphone and headset connections between airplane and seat are automatically disconnected when the seat is ejected.

VERTICAL SEAT ADJUSTMENT SWITCH.

Vertical seat adjustment is accomplished electrically by operation of a momentary contact type switch (figure 1-20) located on the right forward edge of the seat. A vertical seat adjustment of approximately six inches can be made. Holding the switch up moves the seat up and slightly forward; holding the switch down moves the seat down and slightly aft.

HEADREST VERTICAL ADJUSTMENT.

Vertical adjustment of the headrest is made independently of the seat adjustment. The headrest adjustment handle (figure 1-20) is located at the back of the seat on the left side. To adjust the headrest, the pilot operates the seat to its up-limit of travel and then pulls the adjustment handle which disengages the headrest from the seat and bypasses the seat up limit switch. The seat can then be operated up or down to the desired position with respect to the headrest. After the adjusting handle is released, the combined seat and headrest can be positioned vertically as desired by means of the seat vertical adjustment switch.

SHOULDER HARNESS LOCK HANDLE.

The shoulder harness lock handle (figure 1-20), located on the left forward edge of the seat, is conventionally operated for manual locking and unlocking the shoulder harness. In addition, the shoulder harness inertia reel will automatically lock under sudden deceleration G-forces. It is recommended that the shoulder harness be manually locked during take-off and landing and during flight in rough air. The shoulder harness is automatically locked before seat ejection when the leg braces are raised to the locked-up position. After automatically locking the harness, it will remain locked until the lock handle is moved to the lock position and then to the unlock position.

PILOT'S LEG BRACES.

The pilot's leg braces (figure 1-20) are integral with the ejection seat and, when pulled up into the locked position, protect the pilot's legs during seat ejection. Actuating the leg braces into the locked-up position locks the inertia reel, which secures the shoulder harness and the pilot against the seat, arms the seat catapult by pulling the safety pin, connects the firing wire between the catapult and the canopy, and actuates the cockpit manual dump valve to release cockpit pressurization. As the canopy blows aft during the ejection operation, the canopy trailing wire fires the seat catapult.

WARNING

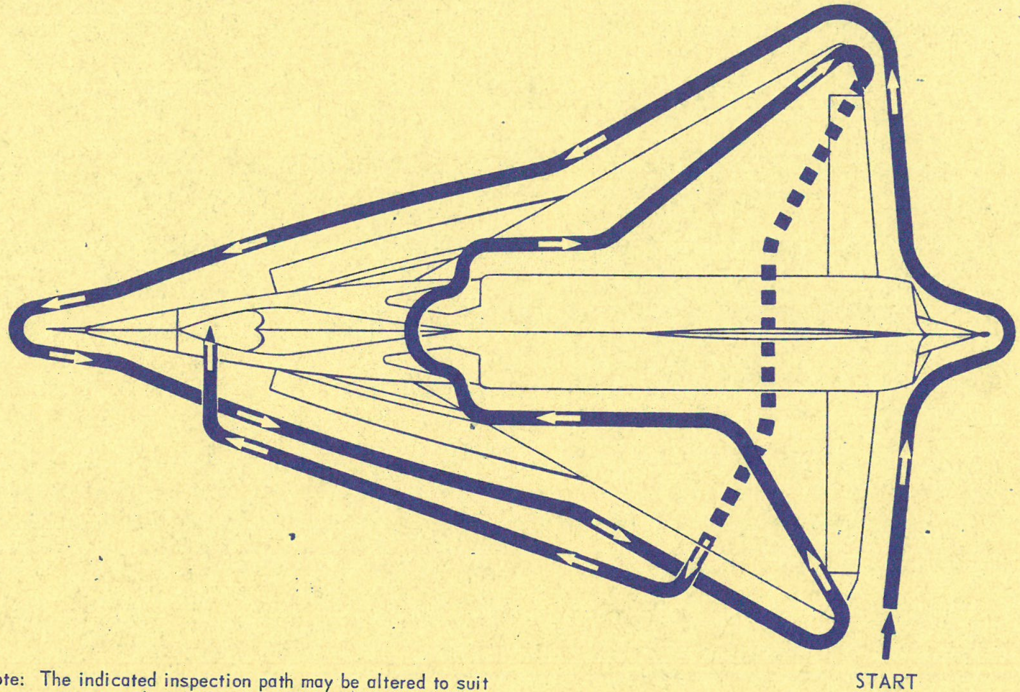
With the canopy inadvertently removed, up movement of the leg braces will catapult the seat unless the explosive seat ejectors are removed.

PILOT'S FACE CURTAIN.

The pilot's face curtain (figure 1-20), located above the headrest, consists of a nylon curtain and a red handgrip. The nylon curtain protects the pilot's face against the outside air blast during ejection. In the normal ejection sequence, after the leg braces are pulled up and locked, pulling the face curtain forward and down, to its limit of travel opens the three-way valve to the air storage reservoirs which in turn releases canopy seal pressure, canopy latches, and both canopy remover safety pins, and fires the canopy removers. The canopy trailing wire then fires the seat catapult. If it is desired to eject the canopy and not the seat, face curtain operation will fire the canopy only, providing the leg braces are not up and locked. If it is then desired to fire the seat with the canopy thus ejected, pulling the leg braces up fires the seat.

Note

Only the last one and one-half inches of face curtain travel operates the system.



Note: The indicated inspection path may be altered to suit varying conditions; however, the items listed are mandatory.

EXTERNAL (Start at left wing tip)

1. Wing surfaces; elevon hinges and surfaces
2. Fire extinguisher disk
3. Tail pipe covers removed
4. Pressure probes; nozzles; flameholders
5. Fin and rudder
6. Nacelle doors latched; removable panels secured
7. Water rudders
8. Right wing surfaces; elevon hinges and surfaces
9. Right ski-strut track; oleo; sequence valve; uplocks cocked (fwd & aft)
10. Pitot and vane covers removed
11. Left ski-strut track; oleo; sequence valve; uplocks cocked (fwd & aft)
12. Full fuel, 615 gal, JP-4
13. Check with plane captain on oil quantity, right and left, (11 qts.)
14. Duct covers removed; duct doors open; dehydrator bags removed
15. Jato ejection air, 2,000 psi (check with plane captain)
16. "Q" probe cover removed
17. Wheel chocks in place
18. Grounding wires removed
19. Filler stud screws in wing jack-pad mounting bolt holes

ELECTRONIC EQUIPMENT COMPARTMENT

1. Ski emergency air, 3000 psi
2. Oleo pressure 300 ± 20 psi (right and left)
3. Hydraulic quantity (right and left)
4. All circuit breakers in
5. Battery checked
6. Radio equipment (general security)
7. Hatch locked

COCKPIT

1. Windshield clean
2. Ejection seat ground safety pin in, cable attached
3. Seat leg braces down
4. Canopy firing pins in, safety pins out
5. Canopy emergency air pressure, 1850-2000 psi
6. Oxygen pressure, 1200-1800 psi

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Figure 2-1. Exterior Inspection Diagram

CANOPY SEAL PRESSURIZATION.

The canopy seal, installed around the canopy parting line, is inflated with air from the bleed air system. Air flow to the canopy seal is reduced by a restrictor to approximately .10 pounds per minute. Because of this reduction and the distance traveled from the compressor to the seal, air temperature is cooled at the seal to approximately 160°F. At this temperature the canopy seal remains flexible and free of the structure at low outside temperatures. A constant flow of air, through the tube, is maintained at a maximum pressure differential of 5.8 psi between the cabin and ambient air at all speeds and altitudes. The canopy seal selector valve, which controls seal pressurization, is connected to the canopy latches and vents seal pressure to atmosphere when the canopy is unlatched either from inside or outside the airplane. Turning the canopy latch handle, will actuate the seal valve and exhaust seal pressure so that pulling the handle on out (3-inch stroke) will permit the latches to unlock and the canopy to be opened. The valve operates in the same manner when the external canopy latching handle is pulled out from the faired position when unlatching the canopy from outside the airplane.

When the canopy lock pull handle is pushed in, the seal valve is closed and air pressure is admitted to the seal. During emergency canopy ejection the seal valve is automatically operated to relieve seal pressure.

HYDRAULIC RESERVOIR PRESSURIZATION.

The left and right hydraulic system reservoirs are pressurized by bleed air from the engine compressors. Each bleed air line contains a pressure regulator which reduces bleed air pressure to 12 psi. A filter is installed upstream of the pressure regulators in the common supply line. The reservoirs are pre-charged to 5 psi from a ground source of compressed air via the fitting labeled **RESERVOIR AIR PRESSURE**, located in the left nacelle at the hydraulic system ground test panel.

Two fittings, one for each hydraulic reservoir, are provided to check hydraulic reservoir pressurization while the engines are running. These fittings are located in the recessed compartment containing the starter air connection in the left nacelle (12, figure 1-21).

G-SUIT PRESSURIZATION.

Automatic pressurization of the pilot's G-suit is provided by the bleed air system via a high pressure regulator, filter and control valve. The G-suit control valve (1, figure 1-4) is located on the left console. The manual adjustment of the valve can be set for either "LOW" or "HI" range.